Ceramic properties

Alumina

AL-500™

(MAC-A940W)

Description

Alumina ceramic of **94% Al_2O_3** content. Its excellent combination of mechanical, thermal, electrical and chemical properties are well suited to applications across industry.

Prime features

- Dense, non porous and vacuum tight.
- High mechanical strength and hardness.
- Low thermal expansion.
- High volume resistivity.
- Resists abrasion and chemical attack.
- Consistent dielectric constant.
- Readily accepts moly-manganese metallizing for high temperature brazing of assemblies.

Typical applications

- Pressure sensors for fluid flow measurement.
- Wear and barrier coatings for sputtering targets.
- Electron tube components.
- Laser components.

Specifications

- Quality Assurance to ISO 9002.

MAC production capabilities

- Isostatic and dry pressing, green machining.
- CNC grinding and lapping to very tight tolerances.
- Metallising of components.
- High temperature brazing of assemblies.
- Prototype, batch and volume production.

Physical properties*

Color	White
Bulk density (fired), Mg/m^3 [lb/in^3]	3.67 [0.132]
Porosity (apparent), %	0 (fully dense)
Rockwell hardness (R45N)	78
Compressive strength, MPa [lb/in^2]	>2070 [>300,000]
Flexural strength, MPa [lb/in^2]	345 [50,000]
Thermal conductivity, W/m.K [BTU/ft.hr.°F] @RT	20.5 [11.9]
Thermal expansion coefficient, 10^{-6}/C [10^{-6}/°F]	
25-200C [77-390°F]	6.3 [3.5]
200-400C [390-750°F]	7.5 [4.2]
400-600C [750-1110°F]	8.0 [4.4]
600-800C [1110-1470°F]	8.6 [4.8]
800-1000C [1470-1830°F]	9.1 [5.1]
Maximum no-load temperature, C [°F]	1600 [2910]
Dielectric strength, dc kV/mm [V/mil] @RT	25.6 [650]

		25C	300C	500C
Dielectric constant, K^I,	@ 10MHz	9.07	9.53	9.91
	@ 1000MHz	9.04	—	—
	@ 8500MHz	8.98	9.26	9.40
Dissipation factor, tan δ,	@ 10MHz	0.00026	0.00028	0.00341
	@ 1000MHz	0.00062	—	—
	@ 8500MHz	0.00078	0.00155	0.00155
Loss factor, K^I.tan δ,	@ 10MHz	0.00236	0.00267	0.03369
	@ 1000MHz	0.00560	—	—
	@ 8500MHz	0.00700	0.01165	0.01457

Volume resistivity, ohm.cm		
	@ 25C [77°F]	$>10^{14}$
	@ 300C [570°F]	$2.0x10^{12}$
	@ 600C [1110°F]	$4.6x10^{8}$
	@ 900C [1650°F]	$3.5x10^{6}$
Te value, C [°F]		>950 [>1740]

Morgan

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Please note that all values quoted are based on test pieces and may vary according to component design. These values are not guaranteed in anyway whatsoever and should only be treated as indicative and for guidance only

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